Winner of the Montias Prize awarded by The Association for Comparative Economic Studies for the best article published in the Journal of Comparative Economics during a two-year period (2016-2017).

Journal of Comparative Economics 45 (2017) 36–55

Contents lists available at ScienceDirect

Journal of Comparative Economics

journal homepage: www.elsevier.com/locate/jce

Design and evolution in institutional development: The insignificance of the English Bill of Rights☆

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ARTICLE INFO

Article history:
Received 6 April 2016
Revised 24 August 2016
Accepted 29 August 2016
Available online 4 September 2016

JEL classifications:
O1
N00
K1
H1
P5

Keywords:
Institutions
Institutional development
Constitutions
Glorious revolution
Design
Evolution
Critical junctures
Hayek
Bill of rights

ABSTRACT

Murrell, Peter—Design and evolution in institutional development: The insignificance of the English Bill of Rights

This paper challenges a belief that is deeply embedded in mainstream economics—that 1688–1701 saw a fundamental transformation in England that sprang from changes in the highest-level institutions designed by those who understood how to effect productive reform. This is the design hypothesis. The alternative is that change occurred in many features of society over a long period and that the 1688–1701 reforms were just one element in a deep ongoing evolutionary process. The paper presents evidence of two distinct types. First, legal history shows that the high-level institutional measures of 1688–1701 can be characterized primarily as either durable and endorsing the status quo or path-breaking and ephemeral. This is evolutionary trial and error. Second, patterns in structural breaks in myriad data sets reveal that widespread socioeconomic change was under way before 1688 and continued thereafter. Because England's early development provides a popular paradigmatic example for economists, the paper's verdict on the nature of English history is pertinent to debates on transition and development, on the importance of critical junctures, and on the relative roles of culture and institutions. *Journal of Comparative Economics* **45** (2017) 36–55. Department of Economics, University of Maryland, College Park, MD 20742, USA.

1. Introduction

Within mainstream economics, it is a truth almost universally acknowledged that the institutions built immediately after the Glorious Revolution of 1688 forever changed history's path, leading inexorably to Britain's ascent. The literature is replete with approval of North and Weingast's (1989) conclusion that "…the institutional changes of the Glorious Revolution permitted the drive toward British hegemony and dominance of the world".[1] Acemoglu and Robinson (2005) and North et al. (2009), two recent influential works linking institutions and long-term development, endorse this view albeit from very dif-

☆ Lisa Dettling, Paul Grajzl, Nona Karalashvili, and Martin Schmidt provided terrific research assistance. Thanks are due to Boragan Aruoba, Roger Betancourt, Tomas Cvrcek, Valentina Dimitrova-Grajzl, Allan Drazen, Peter Grajzl, Richard Hornbeck, Monica Kerekes, Keith Krehbiel, Suresh Naidu, Ingmar Prucha, Stephen Quinn, Carmen Reinhart, Razvan Vlaicu, John Wallis, Jing Zhang, and participants at ISNIE 2010 in Stirling, the 2010 NBER Summer Institutes on the Development of the American Economy and Political Economy, and the Northwestern Economic History Workshop.

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[1] The North-Weingast model is influential in an "extraordinary range of disciplines" according to Coffman and Neal (2013: 10), who nevertheless are more representative of historians and economic historians in being skeptical of that model.

http://dx.doi.org/10.1016/j.jce.2016.08.007
0147-5967/

ferent perspectives. Acemoglu and Robinson (2012) reiterate that the "The Glorious Revolution limited the power of the king and the executive, and relocated to Parliament the power to determine economic institutions …The Glorious Revolution was the foundation for creating a pluralistic society…The government…steadfastly enforced property rights… Historically unprecedented was the application of English law to all citizens. Arbitrary taxation ceased, and monopolies were abolished almost completely…" It is therefore not surprising that economists frequently use this historical episode as a parable to motivate policy advice.[2] For example, in reviewing the property-rights literature for development economists, Besley and Ghatak (2010) state that: "…limiting coercive power of the state is an important historical feature…of development…A classic reference is North and Weingast (1989) who argued that a decisive point in the history of state development in England came after the Glorious Revolution which limited the arbitrary power of the King subordinating to Parliament his ability to raise taxes."[3]

Indeed, North and Weingast (1989) did shape the way that mainstream economists discuss English history. There are two core elements of their story. The first is that by the beginning of the eighteenth century a credible commitment ensured that the government protected property rights and taxed predictably, encouraging private initiative and enterprise. The second element identifies the institutions that imparted credible commitment, the critical time of institutional change, and the process by which the institutions arose. The commitment mechanism was primarily legal, embodied in the highest levels of law.[4] The decisive moments of legal change were in the years immediately following the Glorious Revolution, with the passage of the Bill of Rights in 1689 and the Act of Settlement in 1701. The process was one of design by forward-looking individuals who understood the ramifications of the new laws. While having no issue with the first element of this story, the constrained government, this paper shows that there is little evidence for the second – which institutions changed, when, and by what process.[5]

Hayek (1960) provides an alternative perspective on process, echoing a tradition going back to Smith, Hume, and, before them, the jurisprudence of the Common Law. He views institutions accumulating as a result of trial and error and survival of the successful, with design secondary. A workable structure is "…the sum of experience, in part handed from generation to generation as explicit knowledge, but to a larger extent embodied in tools and institutions which had proved themselves superior, institutions whose significance we might discover by analysis but which will also serve men's ends without men's understanding of them" (Hayek, 1960, p. 60). The institutions of government and the rights of the English arose in a very long process, which reached culmination in the mid-seventeenth century and thereafter bore fruit. In this view, constitutional law was just one element, with the changes consequent on 1688 largely summarizing existing measures. At least as important as law were a common set of ideas on rights and on the nature of government, plus many lesser instruments and habits of governance.

We thus have two very different visions of the process by which a country first begins to acquire a set of effective institutions, inspired by two different interpretations of English history. One is phrased in terms of conscious design, with the critical changes occurring during bursts of reform concentrated at the highest levels of the institutional structure. The other employs the language of evolution and natural selection, viewing institutional development as the gradual accretion of large numbers of measures, a product of the survival of workable arrangements.

The purpose of this paper is to examine evidence on these two visions of English history – the design and the evolution hypotheses. Hence, the point of departure is very different from previous papers that have that subjected the North-Weingast thesis to critical examination. This paper examines that thesis from the broadest perspective, contrasting the overall vision of the design approach to an evolutionary view, focusing on process, the genesis of institutions, and the timing of change, rather than on the specific effects of particular institutions.[6]

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[2] Coffman and Neal (2013 pp. 10, 12) view the North-Weingast history as providing "support for the Washington consensus" and providing the stylized facts to many scholars who characterize England's institutional development.

[3] For further examples, see Olson (1993) reflecting ideas originally developed as advice to transition countries and Yu (2014) on China, on which Acemoglu and Robinson (2012, pp. 436-432) also have strong pronouncements.

[4] Hence, the North-Weingast approach fits squarely in a very strong intellectual tradition: "…constitutions and constitutional structures are the instruments through which reforms must be effected if ultimate improvements in patterns of political outcomes are to be expected" (Buchanan, 2000, p. 1)

[5] The conclusions are therefore complementary to those of the essays summarized by Coffman and Neal (2013) in that any credible commitment that existed arose via a succession of many events over a long historical period.

[6] See Clark (1996), Quinn (2001), Sussman and Yafeh (2006), and Wells and Wills (2000) for examples of the existing literature. That existing literature usually accepts a hypothesis from North-Weingast that this paper tests, that the measures of 1689 and 1701 fundamentally changed the status quo. Thus the existing literature focuses on whether North-Weingast correctly identified the specific mechanisms by which 1688 changed England.

Clark (1996) uses regression techniques to examine changes in rates of return before and after the Glorious Revolution and during periods of turbulence, showing that 1688 had little effect on rates of return and concluding that the private economy in England was largely insulated from political events throughout the seventeenth century. His conclusion is that any effects of the Glorious Revolution were not through changes in the security of property but he does assume that the Glorious Revolution led to a "new constitutional order – the foundation of the modern British state". The conclusions of the present paper can be regarded as an extension of Clark's acute observations on property rights to the broader institutional framework.

Quinn (2001) assumes that the institutional changes of the 1690′s had an effect and asks whether the effects are strongest in the substitution of sovereign for private debt, in increasing the supply of funds to private borrowers, or in bolstering the private-sector demand for loanable funds. He finds evidence for the last of these (at least after the country was at peace).

Sussman and Yafeh (2006) examine British interest rates and debt in the eighteenth century and conclude that financial markets do not reward countries for institutional reforms in the short run and thus that "The evidence on the importance of the Glorious Revolution and the institutional changes of the seventeenth century as a turning point remains elusive." This paper in fact suggests a reason for that elusiveness – that the institutional changes were small.

The evidence comprises two distinct elements. Section 3 focuses on the highest level constitutional measures, the Bill of Rights and the Act of Settlement, examining the clauses of these measures *qua* legal instruments. If design were operative, then specific laws would be crucial, suggesting an examination of the genesis, the fate, and the precise content of laws. If legal measures had an independent and immediate effect, then their clauses would be innovative, lasting, precise, and readily applicable. In contrast, if the laws resulted from trial and error, many clauses would restate existing practice or settled ideals. Others would be new and many of those would fail. Section 3's examination of the historical context and institutional content of each clause of the relevant laws shows clear evidence of the type of institutional change to be expected from evolutionary processes.

While the evidence of Section 3 rejects the hypothesis that a new constitutional design appeared after 1688, there remains the question of whether that year was decisive in other unspecified ways. Section 4 examines this question of timing. For each of fifty data series covering the decades spanning 1688–1701, I estimate the years of structural breaks using the methods developed by Andrews (1993), Bai (1997), and Bai and Perron (1998). The data cover a large variety of socioeconomic phenomena, reflecting the fact that both design and evolution theorize on events in a whole society undergoing change. Nothing in the pattern of the fifty estimated structural breaks indicates anything distinctive about 1688.

Section 5 provides broad reflections on this paper's implications paper for the interpretation of English history and the process of development, particularly on the role of culture and on the usefulness of the concept of critical junctures when examining fundamental historical change.

2. Background: interpreting the short seventeenth century

This section reviews some preliminaries that are useful in understanding the context of the evidence that follows. For readers versed in the relevant literature, it can be skipped. It begins with the barest facts of pertinent English history. It then proceeds to contrast the design and evolutionary approaches to the interpretations of English institutional development, as exemplified in the seminal works of Hayek and North-Weingast, showing that indeed the design and evolution hypotheses are not straw men.

The short seventeenth century is a staple of English textbooks, beginning in 1603 when James I, the first Stuart monarch, acceded to the throne and ending in the Glorious Revolution of 1688 when William III (husband of James' great-granddaughter, Mary) replaced James II (Mary's father). During that century, the relationship between monarch and Parliament could be characterized as a distinctive Stuart equilibrium. The Kings and their Parliaments had very different goals on religion and foreign policy, with the religious divide fundamental. While Roman Catholics were a small minority of the population and absent as a voice in Parliament, each successive Stuart monarch moved closer to Catholicism. Parliament used its power over the purse to restrain the monarchs, who were continually strapped for cash. As a consequence, the relative roles of the monarch and the legislature in governance and law reached center stage.

Charles I adopted an extreme position in the 1630s, when he tried to rule without Parliament, but financial constraints forced retreat. The conflict resulted in civil war from 1642 to 1649. Parliamentary leaders failed to find a workable method of republicanism during the Interregnum of 1649–1660 that followed the execution of Charles I. The Stuart equilibrium returned with Charles II. The culmination came in 1685 with the ascent of James II, who had openly declared his adherence to Catholicism. Economic growth and a tactical mistake by Parliament – an early vote of adequate funding as a gesture of goodwill – served to loosen the financial constraints on James, giving him enough latitude to implement policies that fomented a rebellion, the Glorious Revolution of 1688. The coda came in the Bill of Rights of 1689 and the Act of Settlement of 1701, often referred to as centerpieces of the British constitution.

For Hayek the process underlying these events began well before the seventeenth century. The medieval period bequeathed the ideal of the supremacy of law, which England permanently retained when it was lost elsewhere. The continuing influence of this idea exerted a profound effect on political debate and the development of English law (H 163).[7] It led to the belief that law can be found in precedent. Thus Magna Carta (1215) was at the fulcrum of seventeenth century struggles, being viewed as the font of habeas corpus, trial by jury, and parliamentary constraints on taxation (H 163).

After the revival of classical scholarship in the 16th century, Greek and Roman ideas influenced English political thought. The popularity of the aphorism 'government by laws and not by men', traced originally to Aristotle, was a product of this revival (H 164-166). Roman legal ideas entered the mainstream of English thought, particularly the understanding that freedom relies on the constraints that law places on authority (H 167). This view paved the way for the decisive struggle between king and Parliament: "the demand for equal laws for all citizens became the main weapon of Parliament in its opposition to the king's aims." (H 167)

The emphasis on historical precedent coevolved with the Common Law, whose central tenets limited the power of Parliament and king. For Hayek, the authority of the Common Law was a fundamental determinant of institutional development. Thus democratic law-making would be arbitrary if it violated pre-existing principles of law, a view that was highly contested

Wells and Wills (2000) use methods similar to those used in this paper when examining post-1688 stock-market data. Their objective is to examine the North-Weingast hypothesis by analyzing whether breaks in stock market prices occur in reaction to an increased threat of the return of the Stuarts. Since their conclusion is that investors responded when they had fears that the whole institutional structure was under threat, their results are consistent with both the design and evolution hypotheses.

[7] Because of the many references to Hayek (1960), a shorthand is adopted, (H 163) meaning Hayek (1960, p. 163).

in the first half of the 17th century (H 168-170, 464), but never questioned by either Charles II or James II. For example, in the Case of Monopolies of 1602, monopolies were cast as a violation of the Common Law and an infringement on liberties (H 168). The Common Law thus initiated modern law on competition, which, critically, had the incidental effect of bringing press freedom to England earlier than elsewhere (H 463)

Crucial in confirming law's supremacy was the removal from the monarch of the power of interpreting and ruling on the law. This had already been substantially accomplished in the first half of the seventeenth century with the deference made to the Common Law and the substantial independence of judges. But the king still had his prerogative courts. Thus, for Hayek, a landmark reform was the permanent abolishment of those courts in 1641, particularly the Star Chamber (H 169). This was key in cementing the separation of powers.[8] Such separation had long been an implicit element of practical governance, but it was formulated explicitly during the mid-century struggles (H 170). By the time of Charles II, the principle of the separation of powers was firmly established and from then on remained central in governing political doctrine (H 170).[9]

Interestingly, Hayek's history of the seventeenth's century's contribution to the "origins of the rule of law" stops at this point. "Out of the extensive and continuous discussion…during the Civil War, there gradually emerged all the political ideals which were thenceforth to govern English political evolution." (H 168) "All these ideas were to exercise a decisive influence during the next hundred years…in the summarized form they were given after the final expulsion of the Stuarts in 1688." (H 170) In the first half of the eighteenth century these ideas gradually penetrated everyday practice (H 171-2), as for example the "final confirmation of the independence of judges in the Act of Settlement of 1701" (H 171). But long before that, the convergence on political ideas had led to a permanent place for the decisive institutions, the Common Law, habeas corpus, Parliamentary control over taxation, trial by jury, and separation of powers.

In sum, Hayek saw the process of English institutional development as evolutionary, widespread across many aspects of the socioeconomic system, with agreement on ideals as important as the creation of concrete structures. In this process "purposive institutions might grow up which owed little to design, which were not invented but arose from the separate actions of many men who did not know what they were doing… something greater than man's individual mind may grow from men's fumbling efforts [through] the emergence of order as the result of adaptive evolution" (H 58-9). Indeed, Hayek observed that this characterization of institutional development was a central part of English legal culture in the seventeenth century, arising among lawyers imbued with the precepts of the Common Law (H 58). The evolutionary ideal embodied in the spirit of the Common Law helped to guide the process of institutional development in seventeenth century England.

North and Weingast start at the opposite end to Hayek – conceptually and temporally – in telling their "story of how these institutions *did* come about in England" (NW 831).[10] After the Glorious Revolution, the "designers of the new institutions" (NW 804) were responsible for changes which "reflected an explicit attempt to make credible the government's ability to honor its commitments" (NW 804), through restrictions placed in the constitution (NW 805). These changes addressed three problems: the royal prerogative allowed the King to ignore legislation; "the Star Chamber, combining legislative, executive, and judicial powers, played a key role", and the crown paid the judges, who served at its pleasure (NW 814).

The most important changes were reversal of these three. The Glorious Revolution "initiated the era of parliamentary 'supremacy' " (NW 816), establishing explicit limits on the Crown's ability to act unilaterally (NW 804), "by requiring Parliament's assent to major changes in policies (such as changing the terms of loans or taxes)" (NW 817). Additionally, before the "…Glorious Revolution, institutions such as the Star Chamber enabled the Crown to alter rights in its favor…", (NW 829), but after the revolution such powers were "curtailed and subordinated to common law, and the prerogative courts (which allowed the Crown to enforce its proclamations) were abolished. At the same time the independence of the judiciary from the Crown was assured. Judges now served subject to good behavior…The supremacy of the common law courts…was thereby assured." (NW 816)

Parliament's role in finance is especially emphasized. "…parliamentary interests reasserted their dominance of taxation issues, removing the ability of the Crown to alter tax levels unilaterally" (NW 819).

Thus, for North and Weingast all important changes were concentrated in the period after 1688, and these changes were a product of an explicit plan to establish credible commitments. The claimed effect on economic rights (NW 804) is well known in the literature. But politics also changed: "…reducing the arbitrary powers of the Crown resulted not only in more secure economic liberties and property rights, but in political liberties and rights as well" (NW 829).

3. Precedent and survival in the Bill of Rights and the Act of Settlement

This section focuses on the major constitutional changes, the Bill of Rights and the Act of Settlement, examining the history of individual clauses, *qua* legal measures. What would one expect to see under the evolutionary and design views?[11] An elementary definition of an evolutionary process is one in which where there is ongoing selection on a population of units that exhibit variation in hereditable properties. Translated into the current context, heredity implies persistence in

[8] The monarch's primacy in administration and Parliament's in legislation were already fully accepted.

[9] Hayek (H 465) goes as far as suggesting that Locke's philosophy of the role of law and the separation of powers summarized views held by lawyers during the Restoration.

[10] As before, a shorthand is adopted, (NW 831) meaning North and Weingast (1989, p. 831).

[11] See Grajzl and Murrell (2015) for an extended discussion of the core elements of an evolutionary theory as applied to the analysis of change in social phenomena.

legal rules, particularly via the use of precedent. Variation means there are competing alternatives, perhaps first arising at the lowest levels of legal process, with coherency and precision in new measures not an automatic result of the process of change. Selection then occurs via the increasing use of particular legal rules at the expense of others.

In a process of design, the emphasis is on new law at the highest level (e.g., constitutional law) produced through explicit reflection that focuses on accomplishing specific goals. Novelty is emphasized more than heredity. Coherence and precision are essential in imparting credibility. Important clauses would not be repealed, limited in application, or fundamentally changed in the years following passage.

Translating these broad visions into operational concepts, the relevant evidence is presented to the reader at three levels of detail. The following text provides a very broad overview and commentary. Tables 1 (on the Bill of Rights) and 2 (the Act of Settlement) provide more detail – the wording of each clause, their novelty, survival, and relevance to credible commitment on economics and finance. These two tables are sufficient for an understanding of the origin and effect of each clause. However, some readers might be interested in even more detail, and especially on sources. For these readers, very detailed information is presented in corresponding appendix tables, which are posted online as Supplementary Content. The appendix tables and the text tables contain the same substantive information, but the appendix tables provide extra information on relevant cases, acts, dates, and historical episodes, together with a full set of footnotes documenting sources.

The first column of each table contains the wording of the critical elements of each substantive measure. The second column summarizes the pertinent legal history to assess innovativeness. The third focuses on the fate of the measure, whether it survived intact, whether it was violated in subsequent years, and whether it had sufficient precision to settle, rather than to foster, dispute. The last column disentangles the effects on two sets of issues, on property rights and government finance and on religion and foreign policy. While the principal emphasis in the design perspective is on credible commitment on economic issues, an alternative perspective casts the long struggle between monarch and Parliament as centered primarily on religion and foreign policy, with economic conflicts mainly collateral.

Of the fifteen measures in the Bill of Rights, nine had no novelty, while an additional three were straightforward extensions of existing law.[12] Of these three, one fixed loopholes in the Habeas Corpus Act of 1679 and one made a vague statement on the right to bear arms. The third rejected the power of the monarch to dispense (allow exceptions to) laws, a power that by the time of Charles II and James II had been both contested in law and had anyway been universally assumed not to apply apart from the monarch being able to lessen statutory punishment for isolated religious infractions.

Three measures were new from a legal perspective. Politically, the most innovative was the one that extended to the monarch the already established legal requirement that government officials take an oath to reject Catholicism, endorsing the replacement of the Catholic James with the Protestant William III. The new measure on Ecclesiastical Commissions was relevant only to religious issues and did little to change the powers of the monarch. Thus, the only measure that was new with any possible relevance to economic issues was the requirement of parliamentary consent for a standing army. William defied the standing army measure in the 1690s until Parliament used its authority over taxation in exactly the way that it had in an analogous instance in the 1670s (Kenyon, 1986, pp. 363; Roseveare, 1973, p. 56). After this, he resorted to a strategy of by-passing the law by, for example, stationing troops abroad.

In sum, the Bill of Rights is best viewed as part of an ongoing process of legal evolution rather than a design to produce credible commitment on property rights or government finance. Most measures were not new, and novelty was centered on religion, not economics. Not surprisingly, given the historical provenance of the clauses, the survival rate was high.

The Bill of Rights and the Act of Settlement were passed in different circumstances. In 1689, a new monarch and Parliament were reaching accommodation in the delicate aftermath of a revolution. In 1701, the monarch and Parliament had dueled for twelve years but the nation was much more secure. There arose, however, the perceived necessity of ensuring a Protestant succession. In doing so in the Act of Settlement, Parliament added unrelated measures that reflected some pique. The Act was thus a mixture of the new and the old.

Of the nine measures in the Act of Settlement, five were new. Of those truly new measures, four did not survive, the exception being restrictions on the holding of government office by naturalized citizens. The argument that the Act of Settlement imparted credibility is therefore weak. This point is surely strengthened by noting that survival of two of the repealed measures would have made impossible a fundamental feature of British governance that remains to this day, Prime Ministerial and Cabinet government.[13] The Act of Settlement was an experiment acted upon by selective processes.

Only three of the measures had direct legal relevance to credible commitment on economic issues. One was not new (monarch cannot impede impeachment) and one was new but was soon vitiated (monarch's employees banned from Commons).[14] From the Bill of Rights and the Act of Settlement together, therefore, there is just one clause that was formally new, survived intact, and had strong relevance to credible commitment on economic issues, the requirement that judges

[12] A number of these had direct legal relevance to economic issues, but in only one of these cases, the extensions to the 1679 Habeas Corpus Act, was there any novelty. This clause, together with the rest of Habeas Corpus, was temporarily suspended a number of times in the following century, including within two months of the Bill's passage. Indeed, the Act of Indemnity after the first suspension was regarded as a much larger violation of Common Law property rights than any that had ever been committed by Charles II or James II (Crawford 1915, p. 629).

[13] The two measures were publicity of Privy Council proceedings and the ban on government ministers serving in the Commons. One was explicitly repealed, one made irrelevant by many later laws.

[14] One of the measures that reflected much historical precedent while formally being new was the requirement that the monarch, the head of the Church of England, participate in its rites.

Table 1
Precedent and survival in the clauses of the Bill of Rights.

Clause	Inheritance or novelty?	Selection? Repealed, limited, or in force unconditionally?	General comments, including relevance to property rights and government finance or to religion and foreign policy.
"William and Mary…be declared king and queen of England…"	Parliamentary had a role in the replacement of Monarchs in 1327, 1399, 1483, 1485, 1649/1660. Parliament's role in successions was already assumed by all, using the precedents of 1399 and 1660.	Act of Settlement, 1701, reaffirmed Parliamentary role in determining succession.	
"all…that…profess the popish religion, or shall marry a papist, shall [not] possess or enjoy the crown and government of this realm…"	Extended to the monarch earlier Acts that established this condition for Parliament and monarch's servants. Monarchs now had to take an oath that they were not Catholic.	Reinforced by Act of Settlement. Survives today.	The most innovative measure, the converse of the doctrine of *cuius regio, eius religio* (whose Kingdom, his religion) dominant in Europe.
"the pretended power of suspending the laws …without consent of Parliament is illegal." [suspending referred to negating a whole Act of Parliament]	In 1392, Parliament rejected use of suspension. Uses in the Stuart period focused on religion and were rejected by courts in 1662, 1673, and 1688. In 1673 Charles II accepted that he had no right to suspend laws affecting property, rights, or liberties. James II did not claim a right to the suspending power.	Unquestioned acceptance.	Common law property rights were never subject to suspension. Suspension could not be used to raise revenues.
"the pretended power of dispensing with laws.. is illegal" [dispensing referred to the deliberate non-application of an Act of Parliament in a single instance]	Pragmatic tool for when Parliaments met irregularly. Limited to non-economic issues by the courts in 1584 and 1602. Parliament refused to give Charles II a general dispensing power. Agreement that the King had right to dispense religious matters occasionally.	Some uncontroversial violations.	The dispensing power was not relevant to taxing, spending, and property rights. Common law property rights could not be dispensed. Charles II and James II used dispensing only to pardon punishments for religious acts.
"…[James II's] Court of Commissioners for Ecclesiastical Causes, and all other commissions and courts of like nature, are illegal and pernicious"	No basis in previous law to stop the monarch from administering religious matters. This clause did not change the legal authority of the monarch, confirmed in Acts of 1641 and 1661.	Only effect was to ban special commissions as constructed by James II. Authority of monarch in religious matters has lasted into modern times.	James' Commission was not a court and only relevant to religious issues. It issued only ecclesiastical penalties and acted within existing law, if not accepted practice.
"That levying money…without grant of Parliament…is illegal"	Sovereignty over taxation was an undoubted ancient right of Parliament. Established for extra-ordinary taxation in 1297. Confirmed for regular taxation by 1400. Neither Charles II nor James II challenged this right of Parliament.	Unquestioned acceptance.	In numerous instances before 1688 Parliament had used this power to curb the ambitions of Kings.
"That it is the right of the subjects to petition the king…"	A right dating to Magna Carta. Petitioning was so common under Charles II that legislation was passed to organize the process. A pivotal Trial in 1688 was concerned with the right to petition, with judges favorable to James upholding that right.	Unquestioned acceptance.	
"That the raising or keeping a standing army… in time of peace, unless it be with consent of Parliament, is against law"	Standing Army unknown until 1645. During 1670′s, Parliament objected to Charles' small army and reduced it to a size determined by Parliament, exerting detailed control over the disbanding process. Parliament refused James II funding for his standing army.	Did not restrict maintaining armies outside kingdom or in times of war. Monarch had right to declare war. William defied a Parliament vote to reduce the army's size. The crisis of 1697–9 resulted in a standing army monitored by Parliament.	In the crisis of 1697–9, Parliamentary control over the budget was the critical factor in enforcing this provision, not the legal position created by the Bill of Rights. The mechanism of controlling the size of the army was, therefore, exactly the same as under Charles II and James II.

(*continued on next page*)

Table 1 (*continued*)

Clause	Inheritance or novelty?	Selection? Repealed, limited, or in force unconditionally?	General comments, including relevance to property rights and government finance or to religion and foreign policy.
"That the subjects which are Protestants may have arms for their defence… as allowed by law"	Restates existing law, but in restricting to Protestants, lessened existing rights. The wording "as allowed by law" connects the measure to previous legislation.	In 1693, Parliament decisively rejected allowing all Protestants to keep muskets. Protests throughout 18th century on gun restrictions make clear that this right was not a general one.	Cemented a religious distinction, but little effect otherwise.
"That election of members of Parliament ought to be free"	The Statute of Westminster of 1275 stated "…because elections ought to be free, the King commandeth…that no Man…shall disturb any to make free Election." An undoubted right during reign of Charles II.	The Statute of Westminster is in force today.	Fundamental for enforcing any democratic rights, but this measure changed nothing.
"That the freedom of speech and debates or proceedings in Parliament ought not to be… questioned out of Parliament"	Right recognized in 1455. Observed in 16th century, including immunity against suit and protection against punishment. The courts in 1668 pronounced that "words spoken in Parliament cannot be dealt with out of Parliament".	Since the early 17th century, no attempt at direct interference in Parliament had succeeded.	Fundamental for enforcing any democratic rights, but this measure changed nothing.
"That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted"	"Excessive bail" fills gaps left by the Habeas Corpus Act of 1679. Restrictions on punishment date from Magna Carta and were embodied in statutes in 1553 and 1641. A culmination of centuries of legal developments: best viewed as correcting small defects in existing law	Habeas Corpus suspended one month after the adoption of the Declaration of Right. Suspended again twice in 1689, and then in 1696, 1708, 1715, 1722, 1745, 1794, 1798–1801, and 1817.	A hugely important element in the pantheon of rights, but the Bill of Rights added little and was violated repeatedly.
"That jurors ought to be duly impanelled… and jurors which pass upon men in trials for high treason ought to be freeholders"	Only element that was not an ancient right was the insistence on freeholder (i.e., landowner) juries for treason cases.	Unquestioned acceptance. The Treason Act of 1695 was more important in constraining the government in treason trials.	A hugely important element in the pantheon of rights, but the Bill of Rights added little
"That all grants and promises of fines and forfeitures of particular persons before conviction are illegal and void"	A restatement of existing law, settled in the early seventeenth century, although there had been violations.	Did not prevent the monarch from seizing property before conviction. Made seizures less attractive for the monarch.	Outlawed 'farming' of pre-trial property seizures.
"And that for redress of all grievances, and for the amending, strengthening and preserving of the laws, Parliaments ought to be held frequently."	Yearly parliaments legislated in 1330—legislation that has never been repealed. The Triennial Act of 1642 dictated parliaments meet every three years. Re-affirmed by Triennial Parliaments Act of 1664. (Violated by Charles II in 1684 and James II in 1688.)	A non-binding measure, since Parliaments have met every year since 1689, more often than envisaged by Parliament in 1689. With the Septennial Act of 1715, a recently elected parliament extended its life to seven years.	"Frequently" gives Parliament fewer powers than the Triennial Parliaments Act of 1664, which was superseded by the Triennial Act of 1694.

were to serve *quamdiu se bene gesserint* (on good behavior) rather than *durante bene placito* (during the King's pleasure). This was already standard practice for William, but not a part of formal law.

It is difficult to make the case that the clause on the tenure of judges had a powerful effect *qua* legal measure. A succession of rulers had accepted the practice of tenure on good behavior, sometimes under pressure of Parliament – Charles I after 1641, Cromwell for the duration of the interregnum, Charles II until 1672, and then William throughout his reign. Thus in fifty-seven of the seventy years before the Act of Settlement, rulers had appointed judges on good behavior and once this type of appointment was given it could not be revoked. It was not used by Charles II after 1672 and James II throughout his reign because of the desire to have courts that would not question the King's ability to dispense religious laws. Once that issue had been made irrelevant by the presence of a Protestant monarch, appointments on good behavior were the norm.

The Act of Settlement's protection of the judiciary was very far from complete. This clause was not due to become effective until the death of Anne (which turned out to be 1714). In the sixty years following the Act all judicial appointments expired on the death of a monarch. At these times (in 1702, 1714 and 1721), some judges were not reappointed. Judges

Table 2
Precedent and survival in the clauses of the Act of Settlement.

Clause	Inheritance or novelty?	Selection? Repealed, limited, or in force unconditionally?	General comments, including relevance to property rights and government finance or to religion and foreign policy.
"…Princess Sophia…of Hanover…is hereby declared to be the next in succession…[and then] the heirs of her body, being Protestants"	Reinforced Parliament's use of religious criteria to set line of succession.	Sophia's son became George I in 1714, the ancestor of all subsequent English monarchs.	Solidified the use of the converse of doctrine of *cuius regio, eius religio* (whose Kingdom, his religion) dominant in Europe. Reinforced the rights of the religion dominant in the country, removing the rights of others.
"That whosoever shall hereafter come to the possession of this Crown, shall join in communion with the Church of England.."	A further increment in the exclusion of Catholics. The Coronation Oath Act 1688 had already stipulated that monarchs should swear to maintain the Protestant religion.	George I had not been raised as an Anglican. Effective in 1714; implementation not certain until then.	
"That [if there is a foreign-born monarch] this nation be not obliged to engage in any war for the defence of any dominions or territories which do not belong to the Crown of England, without the consent of Parliament."	A reaction to William's European wars in protection of the Dutch nation. Clause was based on the Act for the Marriage of Queen Mary to Philip of Spain of 1554.	Relevant only from 1714 to 1760. In defending their interests in Hanover, George I and George II were widely considered to be acting unconstitutionally.	Power over taxation was the way in which Parliaments could enforce this clause. This was needed because any claimed breach of this clause would be subject to debate.
"[No monarch] shall go out of the dominions of England, Scotland, or Ireland, without the consent of Parliament"	A reaction to William's absences. A similar clause was in the Ordinances of 1311, which were repealed in 1322.	Effective only in 1714; implementation not certain until then. Repealed in 1716.	George I requested repeal and then abused the freedom that it gave him.
"...all matters…[relevant to the monarch's] Privy Council..shall be signed by such of the Privy Council as shall advise and consent to the same"	Parliament's attempt to exert greater control over the King's ministers.	To be effective in 1714, but repealed in 1705, before it became effective.	Had this provision not been repealed the subsequent development of English government would have been radically different.
"...no person born out of the Kingdoms…shall be capable to be of the Privy Council, or a member of either House of Parliament, or to enjoy any office or place of trust…or to have any grant of lands, tenements or hereditaments from the Crown…"	A reaction against William's Dutch advisers and of his land grants in Ireland to his followers. Used the precedent of the Act for the Marriage of Queen Mary to Philip of Spain of 1554.	Effective in 1714.	Restricted property rights of non-citizens and naturalized citizens.
"…no person who has an office or place of profit under the King…shall be capable of serving as a member of the House of Commons"	Commons' reaction against William's attempts to heavily influence the workings of the House.	Greatly weakened by statute in 1705–1707, so that the crown had ample scope to give appointments to those in the Commons. By nineteenth century, relevant exceptions were spread over 116 statutes.	Had this provision not been effectively repealed, the Prime Ministerial system of government in England would not have been possible.
"...judges commissions be made *quamdiu se bene gesserint* [during good behavior], and their salaries ascertained and established; but upon the address of both Houses of Parliament it may be lawful to remove them"	*quamdiu se bene gesserint* had been used for approximately half of the 17th century. Parliament had forced Charles I to accept it. William III abided by *quamdiu se bene gesserint*.	Effective only in 1714. Appointments could be ended on accession of a new monarch until 1761. Judicial appointments were terminated in 1714 (3), and 1727 (1). Clause applied only to superior court judges, not to lower level courts. Clause not applicable to Lord Chancellor, the minister in charge of legal system.	Most significant clause of the Act that directly relates to property rights, government finance, and religion. Clause not applicable to Lord Chancellor, who was the chief judge of the Chancery Court, which handled a most property cases.
"That no pardon [by the monarch] be pleadable to an impeachment by the Commons in Parliament." [Impeachment was the indictment phase of the process in Parliament of investigating and trying high-level crimes.]	The Commons declared in 1679 that there was no precedent for a pardon to be a defense against impeachment, a claim that lawyers accepted as valid. William III did not attempt to pardon after impeachments and before trial. Before 1701 there was no claim that a king was prevented from issuing a pardon after trial.	Later debate over whether the restriction was solely during the impeachment process or affected the trial also. George I issued pardons after an impeachment in 1715. which many thought inconsistent with his powers under their interpretation.	

salaries were not separated from the King's own finances until 1761. Indeed William had rejected a 1692 bill that was equivalent to the clause in the Act of Settlement solely because Parliament was not willing to move judge's salaries from the King's account to the nation's.

Importantly, the judicial tenure measure was highly limited in applicability. It never applied to the Lord Chancellor, who as head of the legal system was in possession of an administrative cudgel and who was also a working judge in the Chancery Court, which handled a large proportion of property cases. It applied only to judges in London's three highest Common Law courts. The appointment and dismissal of local justices of the peace was at the whim of the administration. These justices had considerable powers, over both civil matters, in a comparatively litigious society, and criminal affairs, where a suspected offender could be summarily imprisoned whilst awaiting many months for trial. Controlling who exercised these powers was a prerogative of the central administration that was jealously guarded, and was often brought about by large-scale dismissals and appointments upon change of administration, occurring as frequently after 1688 as before (Glassey, 1979, p. 262).

We are thus forced to conclude that the most important elements of the constitutional ' revolution' were religious in nature, restricting certain religious rights. A very strong version of this conclusion, certainly debated among historians, is that the Glorious Revolution was mostly about religion, with law and economics only collateral to the religious issues. Consistent with this, the first official statement of Parliament after James was deposed was "That King James II having endeavoured to subvert the constitution of the kingdom by breaking the original contract between the King and people and by the advice of Jesuits and other wicked persons having violated the fundamental laws…" A crucial clause in the Bill of Rights, and one that is still operative, was to exclude Catholics from the monarchy. This was strengthened in the Act of Settlement, which forced the monarch to participate in the rites of the Church of England. The Bill of Rights restricted to Protestants the right to bear arms.

One question – largely beyond the scope of this paper – is why religion was at the center of the conflict, why Parliament thought it necessary to replace a Catholic monarch and then restrict the succession to Protestants rather than simply imposing its favored policies. The proximate answer to this question would be that Parliament represented an overwhelmingly Protestant country, and its members believed that there was no possibility of compromise with a Catholic monarch, the permanence of which loomed much more strongly after the birth of a son to James in mid-1688.[15] C*uius regio, eius religio* (whose Kingdom, his religion) was dominant in Europe and the monarch was head of the Church of England, meaning at a minimum that Catholic rituals might be forced on all who had ambitions for public office. James' closest ally, Louis XIV, provided a notable lesson in intolerance when he revoked the Edict of Nantes in 1685, leading to mass persecution and emigration of Huguenots, many of whom carried their message to London.[16] In this interpretation, the Catholicism of the Stuarts was an exogenous event, a random mutation perhaps, whose existence affected the evolution of constitutional government in serendipitous ways.

Greif and Rubin (2015) offer a more ambitious thesis – that the Catholicism of the Stuarts was endogenous, a route to generate a mode of legitimacy that was a rival to Parliament's. The divine right of kings and Papal endorsement might give the monarchy a level of support for its policies that was independent of, and challenged, the legitimacy of Parliament, which had been fostered by Protestant monarchs in the previous century. This thesis is broadly consistent with the overall perspective of the current paper. A long-ago event – the English reformation in the first half of the 16th century – had led to a feature of the environment that could be considered exogenous in the late 17th century – Parliament's legitimacy. This meant that the Stuarts' optimal strategy was to emphasize Catholicism, which Parliament could see was a direct challenge to the power it derived from its inherited legitimacy. Given that one side's legitimacy subtracted from the other's, there was no possibility of compromise between a Catholic monarchy and a Protestant Parliament. Thus was the evolution of the English mode of government in the 17th century affected by adventitious events of over a century earlier.

Standard constitutional theory offers a further perspective on whether the Bill of Rights and the Act of Settlement could have succeeded in redesigning the polity. In that theory, constitutional laws have three features. They are the highest-order institutions; they provide rules defining the nature, processes, powers, and duties of a government; and they protect rights from incursions by the majority (Buchanan 2000, Elster et al., 1998 , Elster 2000).

From a purely legal standpoint, no Act of Parliament was of higher order than any other.[17] No super-majority was required to reverse a previous measure and a simple majority of both Houses and the monarch's assent were sufficient to over-ride judicial review. To be sure, many Common Law rules were regarded as sacrosanct, not reversible by Parliament, but no law made this so. To the extent that Parliament could be restrained by the judiciary, the basis was in tradition, a tradition that had developed over time by trial and error.

With respect to the second feature of constitutional laws, defining the nature, processes, powers, and duties of the government, the Bill of Rights and the Act of Settlement did little. Electoral rules are elsewhere; the Habeas Corpus Act was passed in 1679; the relative roles of government and the Common Law are ignored. This list could proceed *ad infinitum*. Notably, when the Act of Settlement potentially stood in the way of England's evolving, ad hoc, Prime-Ministerial governance, it was the clauses of the Act that gave way, not evolving practice.

[15] Certainly, there was evidence consistent with this hypothesis. Szechi (2001) describes plans by advisers of the exiled James to have a Catholic Army and a Catholic Chief Judge.

[16] James was personally hostile to the émigré Huguenots (Gwynn, 1977).

[17] It is often assumed that the requirement of a super-majority for amendment is what separates a constitutional law from all others (Elster, 1995, p. 211).

The changes following 1688 were antithetical to the third feature of constitutional law, protecting rights, because a major motivation of these changes was to restrict certain religious rights. Showing that English gift for irony, a bill of rites became a Bill of Rights.[18] Nothing in the Bill or the Act added anything to strengthen rights, while several clauses diminished them.

There is also a weaker claim concerning the effects of a formal constitution, that formal measures might reinforce existing informal constraints: perhaps an explicit statement increases credibility. This is consistent with Weingast (2005), which views a constitution as providing an explicit focal point for assessing sovereign behavior, the violation of which unifies the opposition. But it seems that the political ideals arising earlier in the century were precise enough to provide the focal point. Charles I and James II both tested this hypothesis, and their fates were dispositive. Moreover, the Bill and the Act did not offer precision: "Parliaments ought to be held frequently"; "That election of members of Parliament ought to be free"; "Protestants may have arms for their defence suitable to their conditions and as allowed by law".[19]

Myriad facts show that the post-1688 measures did not provide any such focal point. Soon after the passage of the Bill, Habeas Corpus was suspended at a stroke. The standing army issue was not settled by legal processes, but rather by the time-honored means of Parliament's command over finances. The statement of the right to bear arms left the relevant precision to 'ordinary laws'. One hundred and sixteen statutes eviscerated the restriction that servants of the Crown could not be members of the House of Commons. Tables 1 and 2 are replete with similar facts that show that explicit statements in the Bill of Rights and the Act of Settlement did not produce an independent effect.

Of course, many years after their passage, the Bill and the Act acquired great symbolic significance. But this is irrelevant to current concerns. Indeed, if duration results in greater symbolic importance and therefore more effectiveness, the whole logic of constitutionalism is reversed. Constitutional measures are not important because of the precision they give to law but their survival over time leads to their autonomous effect. This is thoroughly consistent with an evolutionary perspective.

In sum, there is compelling evidence that the Bill of Rights and the Act of Settlement were one element in the ongoing process of evolution of English law. The few measures that were innovative and survived were not directly relevant to economic issues, but focused on religion. A long process of trial and error over the seventeenth century led to the institutions that determined the functioning of government in Britain in the eighteenth century as it pertained to economic matters. Of course, the religious settlement in the Bill and the Act could have had a large indirect effect on economic issues, by ensuring that the polity would no longer become dysfunctional via religious struggles between the monarch and Parliament. But this is a very different story than the one emphasizing credible commitment on property and taxes.

4. Structural breaks in many socioeconomic data series

Section 3 rejects the hypothesis that a new constitutional design appeared after 1688. But that year could have been decisive in other unspecified ways. Therefore the paper now turns to the question of timing: when did widespread change came to England? This section uses the econometrics of unknown structural breaks (Andrews 1993; Bai and Perron, 1998; Hansen, 2000) to estimate the years in which breaks occur in numerous data series, assessing statistical significance and obtaining confidence intervals. Because a large variety of data series are used, these estimates provide a new descriptive picture of change in newly developing England.

The two competing theories have very different implications about patterns of breakdates. The design hypothesis is one of focused, significant change as a direct result of the institutional measures of 1688–1701. One would expect to see a clustering of breakdates after 1688, with fewer before. The evolution hypothesis is one of gradual and widespread development, with significant elements of change already occurring earlier in the seventeenth century. One would expect a spread of breakdates over the century surrounding 1700. These predictions are precise enough to differentiate between the two hypotheses given a sufficient number of data series.

The first step in the analysis was to collect time-series data on as many phenomena as possible for the relevant years. Although such an inclusive search for data for any modern period would soon leave the researcher overwhelmed, this is not the case for seventeenth century England given the requirement of having a sufficient number of yearly observations without missing values.[20] Nevertheless, the tests examine over fifty different data series. There are data on standard economic measures, such as production, factor returns, prices, and exchange rates, but also on inventive behavior, literary activity, government, and judicial behavior.

Table 3 lists the features of the data sets. The most important criterion for inclusion was a sufficient number of observations surrounding and including 1700. The lower limit was thirty relevant observations, or for decadal series twenty.[21] To the extent possible, observations were centered on 1700 and those from 1640 to 1760 were used. These years bookend an era of great historical change, beginning with the failure of Charles I's attempt to rule without Parliament and ending with the death of George II, the last British monarch to be born outside the British Isles. In order to include sufficient numbers

[18] Thanks to Keith Krehbiel for suggesting this ironic homophone.

[19] The ambiguity of one clause of the Act of Settlement could easily have caused a crisis in 1715 had political circumstances been different. As Table 4 explains the following statement is very imprecise: "That no pardon under the Great Seal of England be pleadable to an impeachment by the Commons in Parliament."

[20] Series with a small number of missing values were accepted. Some decadal series are used where they cover important phenomena not measured in yearly data.

[21] For the latter there was also an upper limit, since inclusion of observations outside the 17th and 18th centuries would involve other epochs.

Table 3
Data series: definitions, sources and summary statistics.

Variable	Source	Years	Obs.	Mean	Std. dev.
Property offenses as % of all crime*	Old Bailey Proceedings Online (2009)	1674–1726	50	0.699	0.114
Punishment Severity for property crimes*	Old Bailey Proceedings Online (2009)	1674–1726	49	0.443	0.200
Level of consumer prices (Schumpeter)	Schumpeter (1938)	1661–1740	80	105.8	13.14
Growth of consumer prices (Schumpeter)	Schumpeter (1938)	1662–1740	79	-0.1	6.7
Level of producer prices (Schumpeter)	Schumpeter (1938)	1661–1740	80	95.58	9.483
Growth of producer prices (Schumpeter)	Schumpeter (1938)	1662–1740	79	-0.2	4.6
Level of bread prices (Mitchell)	Mitchell (1988), ch. 14, Table 22	1640–1757	118	5.659	1.250
Growth of bread prices (Mitchell)	Mitchell (1988)	1641–1757	117	0.015	0.171
Level of Wheat Prices (Mitchell)	Mitchell (1988), ch. 14, Table 16	1640–1760	121	35.82	9.769
Growth of wheat prices (Mitchell)	Mitchell (1988)	1641–1760	120	2.5	24.3
Level of beer production	Mitchell (1988), ch. 8, Table 3a	1684–1726	43	2979	342
Growth of beer production	Mitchell (1988), ch. 8, Table 3a	1685–1726	42	−0.1	4.9
Level of spirits production	Mitchell (1988), ch. 8 Table 5	1684–1726	43	1692	1010
Growth of spirits production	Mitchell (1988), ch. 8 Table 5	1685–1726	42	0.058	0.134
% unfunded government debt (Mitchell)	Mitchell (1988), ch. 11 Table 7	1691–1726	36	49.6	32.2
% unfunded government debt (Quinn)	Quinn (2006)	1691–1726	36	0.392	0.278
Works in 'Early English Prose Fiction'	Early English Prose Fiction (2009)	1660–1700	41	1.683	1.650
English publications in British Library	English Short Title Catalogue (2009)	1640–1760	121	1615	540.8
English publications in EEBO	Early English Books Online (2009)	1660–1700	41	1146	477.2
Exchange rate, Hamburg, schilling/£*	Mitchell(1988), ch. 12, Table 22	1640–1760	99	34.19	1.257
Exchange rate, Paris, ecu/£ *	Mitchell (1988), ch. 12, Table 22	1640–1760	97	0.025	0.008
Real GDP	Broadberry and van Leeuwen (2010); Apostilides et al. (2008)	1640–1760	121	98.92	14.57
Growth in real GDP	Broadberry and van Leeuwen (2010); Apostilides et al. (2008)	1640–1760	121	0.6	5.1
Number of estate acts **	Bogart and Richardson (2010)	1640–1760	107	13.05	10.71
Level of arable prices (Clark)	Clark (2003)	1640–1760	121	57.70	10.34
Growth of arable prices (Clark)	Clark (2003)	1640–1760	121	0.8	13.8
Level of pasture prices (Clark)	Clark (2003)	1640–1760	121	48.55	4.446
Growth of pasture prices (Clark)	Clark (2003)	1640–1760	121	0.1	6.8
Level of wood prices (Clark)	Clark (2003)	1640–1760	121	88.26	8.435
Growth of wood prices (Clark)	Clark (2003)	1640–1760	121	4.49	10.5
Level of farm prices (Clark)	Clark (2003)	1640–1760	121	54.53	6.902
Growth of farm prices (Clark)	Clark (2003)	1640–1760	121	0.3	8.9
Nominal farm wages (Clark)	Clark (2001)	1670–1730	61	10.30	0.437
Growth of nominal farm wages (Clark)	Clark (2001)	1671–1730	60	0.2	5.0
Real agricultural output (Clark)**	Clark(2002)	1600–1800	21	54.83	5.955
Growth of real agricultural output (Clark)**	Clark(2002)	1610–1800	20	1.3	7.3
Real agricultural output per farm worker (Clark)**	Clark(2002)	1600–1800	21	77.45	7.23
Growth of real agricultural output per farm worker (Clark)**	Clark(2002)	1610–1800	20	0.2	8.0
Real wages of laborers	Allen (2001)	1640–1760	121	7.28	0.96
Growth of real wages of laborers	Allen (2001)	1640–1760	121	0.6	9.1
Real wages of craftsmen	Allen (2001)	1640–1760	121	10.7	1.41
Growth of real wages of craftsmen	Allen (2001)	1640–1760	121	0.4	8.9
Level of real wages (Allen)	Allen (1992)	1640–1760	121	13.76	1.32
Growth of real wages (Allen)	Allen (1992)	1640–1760	121	0.2	4.1
Level of consumer prices (Allen)	Allen (1992)	1640–1760	121	0.880	0.087
Growth of consumer prices (Allen)	Allen (1992)	1640–1760	121	0.049	4.7
Level of real rent per acre	Allen (1992)	1640–1760	121	11.14	2.110
Growth of real rent per acre	Allen (1992)	1640–1760	121	0.5	4.7
Number of patents	Sullivan (1989)	1661–1740	80	5.550	4.48
Growth of number of patents*	Sullivan (1989)	1662–1740	75	22.5	112.2
Number of patents	Sullivan (1989)	1661–1740	80	9.400	8.32
Growth of number of patents *	Sullivan (1989)	1662–1740	75	4.61	185.8
Level of direct tax revenues	O'Brien and Hunt (1993)	1655–1745	90	1225	680.1
Growth of direct tax revenues	O'Brien and Hunt (1993)	1656–1745	89	15.0	75.6
Level of indirect tax revenues	O'Brien and Hunt (1993)	1655–1745	90	2623	1531
Growth of indirect tax revenues	O'Brien and Hunt (1993)	1656–1745	89	4.1	21.6
Level of government revenues	O'Brien and Hunt (1993)	1655–1745	90	3997	1995
Growth of government revenues	O'Brien and Hunt (1993)	1656–1745	89	4.2	24.2

For more precise definitions of each variable, see the Appendix version of Table 3 in the online Supplementary Content.
* Some years missing in the data series.
** observations are decadal, not yearly.

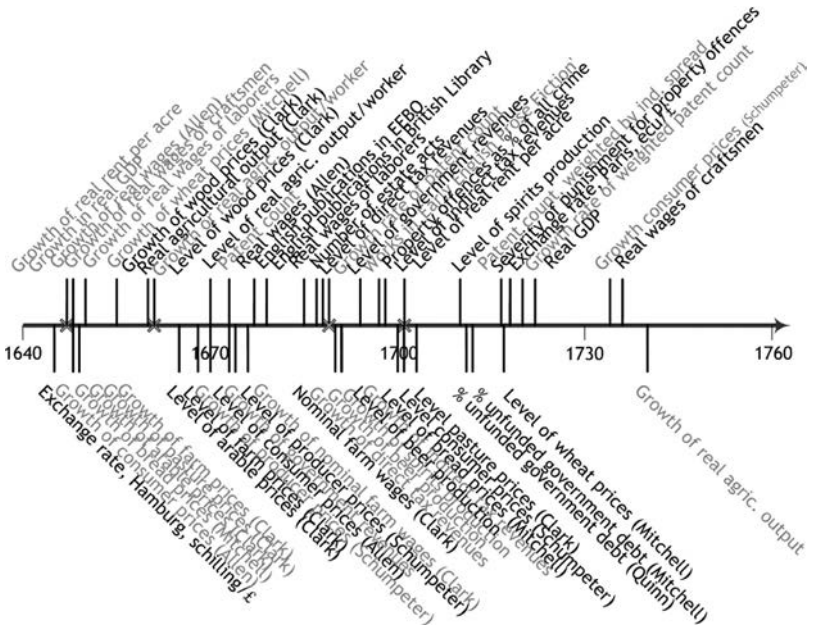

Fig. 1. Estimated breakdates from all available data sets.

of observations, the centering around 1700 was relaxed for series beginning after 1675. In those cases, in order to preserve balance before and after 1700, the chosen end point was 1726 (the last full year of the reign of George I, the first monarch whose tenure depended on the Act of Settlement).

The model is the following:

$$y_t = \alpha_1 + \varepsilon_t \quad t = 1, 2, ..., k-1$$
$$y_t = \alpha_2 + \varepsilon_t \quad t = k, k+1, ..., T$$

where y_t is the variable of interest, the α_i are its unknown mean values before and after the break, T is the length of the time series and k is the year of the unknown break. The estimate of k is the year that minimizes the sum of the residual sum of squares of two separate regressions, one each side of the break (Bai 1997; Bai and Perron 1998). The test statistic is the maximum of all the Chow F-test statistics calculated using each year as a potential break (Quandt 1960; Andrews 1993). Estimation of confidence intervals uses robust techniques allowing for changing error distributions before and after the break and for autocorrelation in error terms (Bai 1997).[22]

One difficult question is whether to use data on levels or rates of growth, or both. Increases in growth rates are almost synonymous with the beginning of development. However, growth rates have very high coefficients of variation in the relevant time period. The growth rates are often insignificantly different from zero on both sides of the estimated breaks, implying low power for tests of significance of a structural break and wide confidence intervals. Levels variables have less variation and many more significant test statistics. But a one-time change in levels without any permanent change in growth is not what is usually meant by development. Nevertheless, tests on levels can provide information on breaks in growth.

What results would appear when searching for a structural break in a levels variable when there has been a structural break in growth? The literature contains only a few hints to answer this question and the search for a complete answer is well beyond the scope of this paper. However, a methodological appendix included in the Supplementary Content provides a clear message by using existing theoretical results and presenting simulations that match the scenario under study. Given the assumption of structural breaks in growth, tests for structural breaks on both growth and levels variables offer valuable information serving to differentiate between the design and evolution hypotheses. The methodological appendix does show that there is a bias toward accepting the design hypothesis over the evolution hypothesis if the break is in growth and the test is for a break in levels. But given the results obtained, the presence of this bias merely serves to bolster the overall conclusions of this paper.

Table 4 presents the results. For each series, the null hypothesis is no break, and the alternative is a single break. The essential message is best conveyed in a simple timeline, presented in Fig. 1. Four historical episodes are marked, 1649, the beheading of Charles I, 1660, the restoration of the monarchy, 1688, and 1701. Series names are attached to the timeline

[22] In practice, allowing for autocorrelation does not change the average size of estimated confidence intervals but allowing error variances to vary across the breakdate does reduce average size.

Table 4
Estimates of single structural breaks in data series on English development spanning 1700: Year of break, significance, direction of change, and confidence interval.

Variable name	Data years	Estimates of a single break		90% Confidence intervals	
		Break date	Tendency	Start year	End year
Property offences as % of all crime	1674–1726	1697*	Increase	1695	1698
Severity of punishment for property offences	1674–1726	1718*	Increase	1716	1719
Level of consumer prices (Schumpeter)	1661–1740	1701*	Decrease	1697	1703
Growth of consumer prices (Schumpeter)	1662–1740	1734	Increase	1720	1740
Level of producer prices (Schumpeter)	1661–1740	1674*	Decrease	1669	1675
Growth of producer prices (Schumpeter)	1662–1740	1668	Decrease	1661	1673
Level of bread prices (Mitchell)	1640–1757	1700*	Decrease	1692	1705
Growth of bread prices (Mitchell)	1641–1757	1648	Decrease	1640	1663
Level of wheat prices (Mitchell)	1640–1760	1717*	Decrease	1708	1724
Growth of wheat prices (Mitchell)	1641–1760	1655	Increase	1640	1675
Level of beer production	1684–1726	1691*	Decrease	1691	1693
Growth of beer production	1685–1726	1690	Decrease	1684	1691
Level of spirits production	1684–1726	1710*	Increase	1708	1711
Growth of spirits production	1685–1726	1691	Decrease	1684	1694
% unfunded government debt (Mitchell)	1691–1726	1712*	Decrease	1711	1713
% unfunded government debt (Quinn)	1691–1726	1711*	Decrease	1710	1712
Works in 'Early English Prose Fiction'	1660–1700	1694	Increase	1669	1699
English publications in British Library	1640–1760	1679*	Increase	1674	1686
English publications in EEBO	1660–1700	1679*	Increase	1674	1682
Exchange rate, Hamburg, schilling/£**	1640–1760	1648*	Decrease	1645	1649
Exchange rate, Paris, ecu/£**	1640–1760	1718*	Increase	1716	1719
Real GDP	1640–1760	1722*	Increase	1719	1723
Growth in real GDP	1640–1760	1647	Increase	1640	1648
Number of estate acts	1640–1760	1688*	Increase	1684	1689
Level of arable prices (Clark)	1640–1760	1665*	Decrease	1653	1674
Growth of arable prices (Clark)	1640–1760	1649	Decrease	1640	1658
Level of pasture prices (Clark)	1640–1760	1703*	Decrease	1700	1707
Growth of pasture prices (Clark)	1640–1760	1649	Decrease	1642	1684
Level of wood prices (Clark)	1640–1760	1661*	Increase	1652	1663
Growth of wood prices (Clark)	1640–1760	1655*	Increase	1653	1658
Level of farm prices (Clark)	1640–1760	1665*	Decrease	1659	1671
Growth of farm prices (Clark)	1640–1760	1649	Decrease	1640	1662
Nominal farm wages (Clark)	1670–1730	1690*	Decrease	1683	1693
Growth of nominal farm wages (Clark)	1671–1730	1676	Decrease	1670	1688
Real agricultural output (Clark)***	1600–1800	1660*	Increase	1650	1670
Growth of real agricultural output (Clark)***	1610–1800	1740	Decrease	1720	1800
Real agricultural output per farm worker (Clark)***	1600–1800	1670*	Increase	1650	1680
Growth real agricultural output/farm worker (Clark)***	1610–1800	1660	Increase	1610	1700
Real wages of laborers	1640–1760	1685*	Increase	1682	1687
Growth of real wages of laborers	1640–1760	1650	Increase	1640	1656
Real wages of craftsmen	1640–1760	1736*	Increase	1734	1738
Growth of real wages of craftsmen	1640–1760	1648	Increase	1640	1653
Level of real wages (Allen)	1640–1760	1677*	Increase	1672	1678
Growth of real wages (Allen)	1640–1760	1648	Increase	1640	1651
Level of consumer prices (Allen)	1640–1760	1670*	Decrease	1666	1671
Growth of consumer prices (Allen)	1640–1760	1648	Decrease	1642	1653
Level of real rent per acre	1640–1760	1701*	Increase	1698	1702
Growth of real rent per acre	1640–1760	1647	Increase	1641	1651
Patent count	1661–1740	1673	Increase	1661	1674
Patent count, weighted by industrial spread	1661–1740	1716	Increase	1692	1724
Growth rate of patent count**	1662–1740	1690	Increase	1661	1694
Growth rate of weighted patent count**	1662–1740	1720	Increase	1661	1722
Level of direct tax revenues	1655–1745	1689*	increase	1687	1690
Growth of direct tax revenues	1656–1745	1690	decrease	1678	1705
Level of indirect tax revenues	1655–1745	1698*	increase	1697	1699
Growth of indirect tax revenues	1656–1745	1700	decrease	1656	1712
Level of government revenues	1655–1745	1692*	increase	1691	1693
Growth of government revenues	1656–1745	1673	decrease	1656	1731

* Significant at 10%.
** Some years missing in data series.
*** Decadal rather than yearly observations.

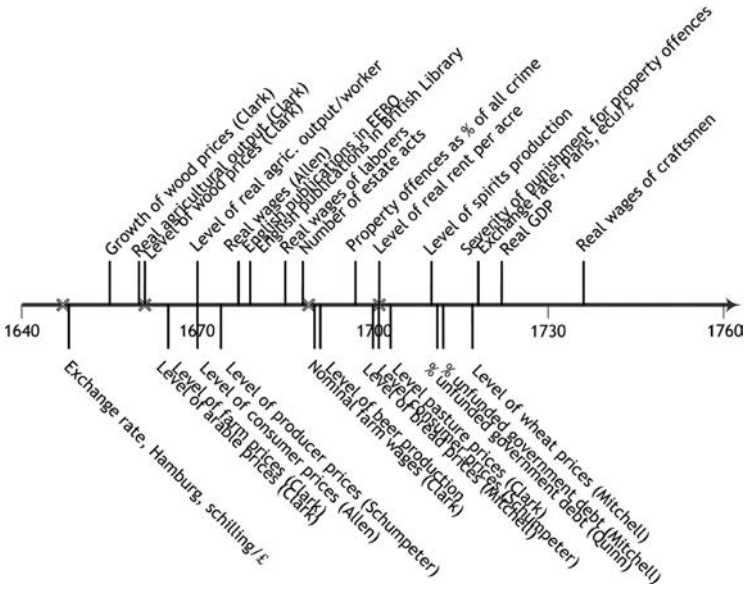

Fig. 2. Estimated breakdates that are statistically significant.

at the estimated break-point of the series. They are in bold if the breakdate estimate is significant at the 10% level. Names appear in the upper half of the diagram if the mean values of the variables increase after the breakdate and in the lower half if there is a decrease.

Fig. 1 clearly shows that neither the period 1689–1701 nor the following years are special in any way. Change is widespread, with measures of very different phenomena exhibiting significant breakdates, but change is no more intense after 1688 than before. Fig. 2, showing only the significant breakdates, gives exactly the same message as Fig. 1. [23]

Of the 58 series, 32 have breakdates that are significant at the 10% level, powerful evidence that change is really happening. Of the 58 breakdates, 29 fall before 1688, with 13 of the 32 significant ones doing so. Only 16 breakdates (9 significant) would fall before 1688 if the placement of breakdates were purely random and one assumed that each year had an equal probability of providing the breakdate within each series. Eighteen breakdates occur during 1688–1710, the number to be expected from random chance.

Fig. 3 displays confidence intervals, with the series ordered by breakdate and evenly spaced on the horizontal axis. The year of the breakdate is plotted on the vertical axis, together with 90% confidence intervals. Nearly half (25 of 58) of the estimated confidence intervals end before 1688. The line traced out by the breakdates is as close to straight as one is likely to observe in a statistical process with this much noise. This is the epitome of gradual change.

Are the changes improvements? To address this question, each of Fig. 4(a)–(d) focuses on relatively homogenous subgroups of the data series. Within each group, an improvement moves each series in the same direction. All four figures indicate that improvements were under way before 1688.[24] The directions of change and their breadth indicate a nation beginning the development process. Improvement is widespread and occurring in every facet of society for which data are available. Adverse changes are more frequent after 1688 than before.

There remains one further check on the results. For each series, the above uses the null of no break against the alternative of one break. Bai and Perron (1998, 2006) have developed theory and methodological guidelines for the case of more than one break. First, a test is used to check the hypothesis of no breaks against any positive number of breaks. Second, if that test rejects the hypothesis of no break, then a sequence of Andrews-type F-tests are applied to test every single move to a higher number of breaks. The process stops when the test rejects the addition of one more break.[25]

[23] Significance is more prominent in levels than in growth variables. The Appendix shows clearly why this might be the case given the amount of noise in the growth data.

[24] Prices are generally increasing at the beginning of the time period, but evidence stability or even some decline later. Declines in growth rates of prices therefore signal greater monetary stability. Moreover, under a gold standard (at this time there was a actually a gold-silver standard), prices generally move in the opposite direction to productivity changes (Bordo et al. 2010). Decreases in price variables signal improvement.

The major exception to the observation of general improvement is in government revenues, where declines in growth rates are observed (in 1673, 1690, and 1700 in the different series). These break estimates reflect the fact that revenue generation was extremely robust in the decades before 1688 and that growth rates fell from a high level. There were also declines in the growth rates of beer and spirits production, perhaps due to a new tax imposed on these commodities (von Ranke, 1875, p. 74).

[25] The tests allow for autocorrelation and for differences in error variances across the break.

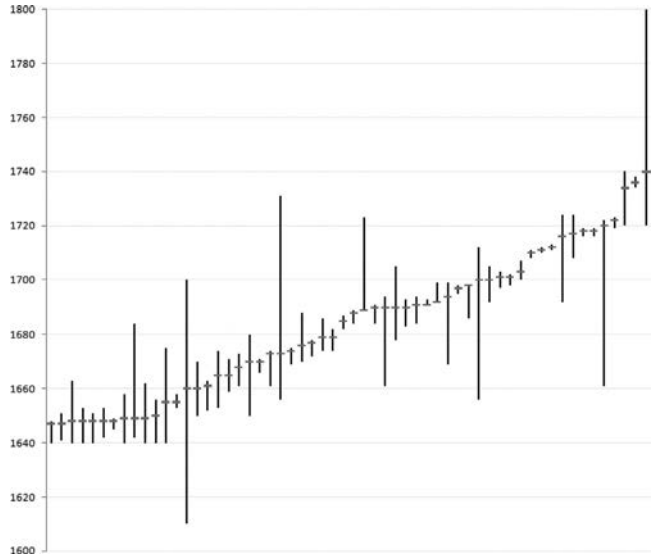

Fig. 3. Confidence intervals for estimated breakdates ordered by estimated breakdate.

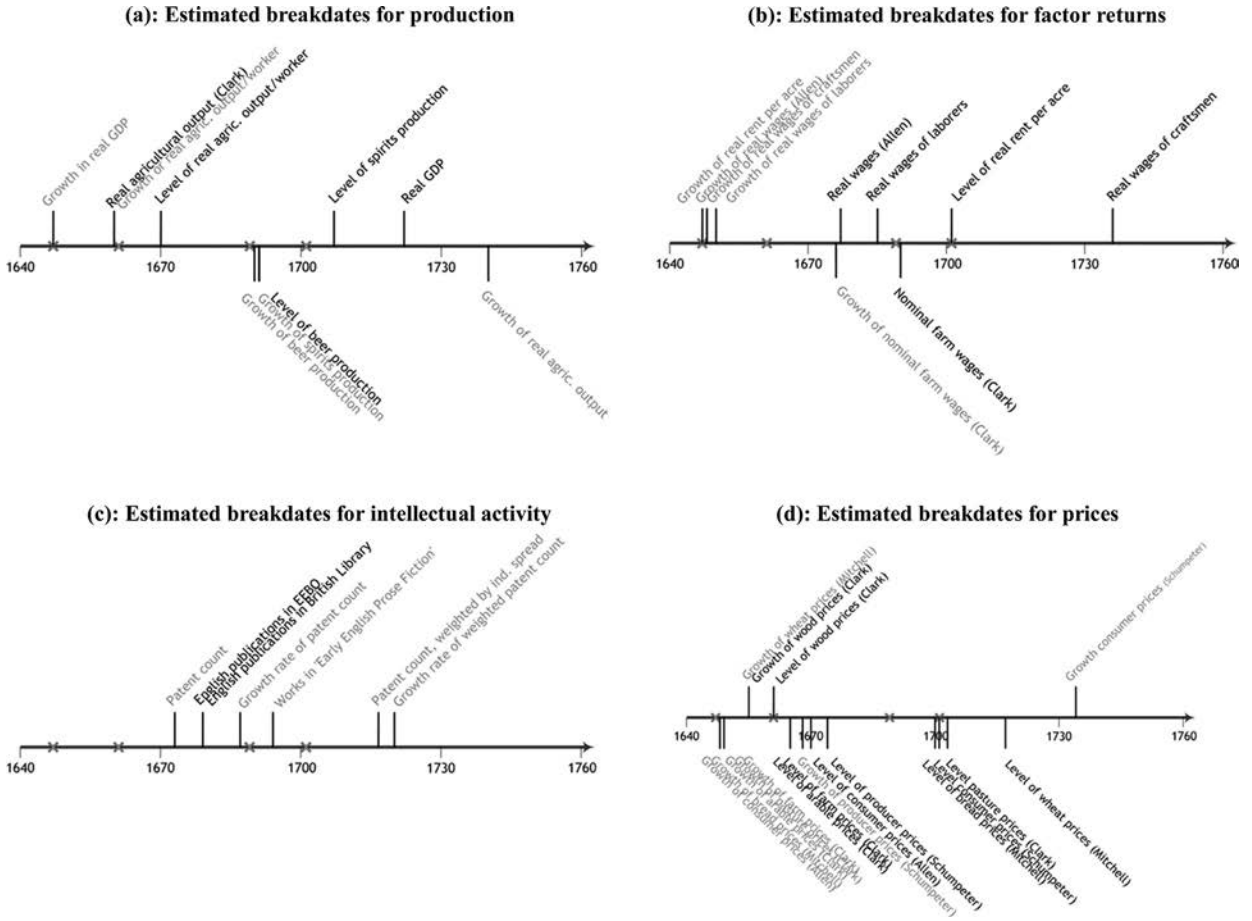

Fig. 4. (a) Estimated breakdates for production, (b): estimated breakdates for factor returns, (c): estimated breakdates for intellectual activity, (d): estimated breakdates for prices.

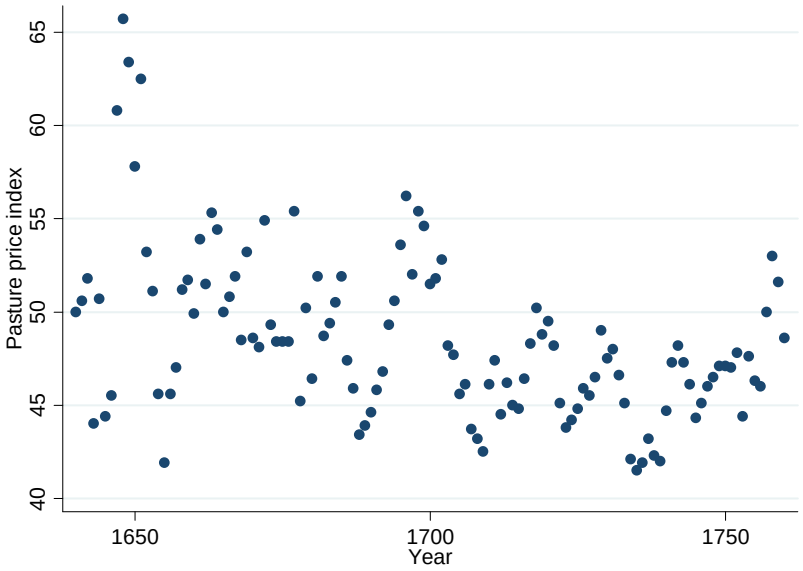

Fig. 5. Clark's price index for pasture output: a series with multiple estimated breaks.

Table 5 lists the number of breaks found by this methodology and the years of the statistically significant breakdates.[26] When there are multiple breaks the years are listed in the order in which the testing procedure found them. This means that the most important breaks in the series are listed first.[27] For 30 of the 58 series, this procedure produces the same results as before, that is multiple breaks are not found.[28] For the remaining 28 series, 23 of the most important breakdates in Table 5 are the same or very close to those listed in Table 4. For 27 of those 28 series, the single estimated breakdate in Table 4 falls on the same side of 1688 as the most important breakdate in Table 5.

Most of the series with multiple breakdates are levels series. This reflects cyclicality. Fig. 5 provides an example, a scatter plot for Clark's index of pasture prices, which is one of the few series where the identified breakdate in Table 4 is not matched closely by an entry in the multiple breakdates given in Table 5. The breakdates in Table 5 reflect cycles, with an increase in 1647, a decrease in 1652, a further decrease in 1687, an increase in 1693, and an decrease in 1700. In fact, the search for multiple breakdates serves to obfuscate the downward trend in the series that is evident in the data from 1650 onwards and that is clearly identified by the estimates for both growth rates and levels given in Table 4 and for growth rates alone in Table 5.

One result in the literature provides evidence of a similar nature to that presented in the preceding paragraphs, and comes to different conclusions. Using structural break tests similar to those above, Bogart (2011) shows that transport investment increased in the 1690s. He concludes that "…the Glorious Revolution influenced a sector that was arguably necessary for Britain's economic development." But the source of that improvement reveals much about the way in which 1688 might have changed matters in this particular sphere. Bogart (2011) stresses the lessening of conflict between Crown and Parliament, making investors in transport less uncertain about the effects of political changes. Indeed, Hoppit (2011) concludes that "the crucial development after 1688 was less with the enhanced security of property rights, more with the expanded capacity of property to be alienated". That is, a less contentious polity might find it more productive to expropriate property for some claimed public good.

Recent results by Bogart (2016), on investment by the East India Company, show how nuanced were any effects of the Glorious Revolution. There was no surge in the Company's investment after 1688, perhaps even a decline, apparently because the increasing importance of Parliament led to heightened concerns arising from the uncertainty induced by elections. In sum, Bogart's important work shows a variety of changes occurring after the Glorious Revolution, some increasing uncertainty, others decreasing it, and some increases in investment that can hardly be connected to the institutional changes within the Bill of Rights and the Act of Settlement. Indeed, the variegated story of the developments in particular policy areas that is provided by Bogart (2011, 2016) would give rise to patterns of change similar to those contained in Fig. 1.

[26] Thanks are due to Monica Kerekes who provided the relevant software, See Kerekes (2008) for more details.

[27] Bai and Perron (1998, pp. 63-64) show that when there are multiple breaks the first break estimated is a consistent estimate of the most important break "in terms of the relative magnitude of the shift and the regime spells".

[28] If the procedure has zero significant breaks, then the procedure would have found the year in Table 4 as the most important break.

Table 5
Consistency of estimates of multiple breaks with estimates of single-breaks.

Variable name	Data years	Single break estimates from Table 4	Estimates of multiple breaks	
			Number of breaks	Breakdates
Property offences as % of all crime	1674–1726	1697*	2	1699, 1685
Severity of punishment for property offences	1674–1726	1718*	2	1718, 1686
Level of consumer prices (Schumpeter)	1661–1740	1701*	> 5	1701, 1667, 1694, 1687, 1731
Growth of consumer prices (Schumpeter)	1662–1740	1734	1	1734
Level of producer prices (Schumpeter)	1661–1740	1674*	> 5	1677, 1669, 1714, 1690, 1685
Growth of producer prices (Schumpeter)	1662–1740	1668	1	1668
Level of bread prices (Mitchell)	1640–1757	1700*	1	1700
Growth of bread prices (Mitchell)	1641–1757	1648	1	1648
Level of wheat prices (Mitchell)	1640–1760	1717*	1	1717
Growth of wheat prices (Mitchell)	1641–1760	1655	1	1655
Level of beer production	1685–1726	1691*	2	1692, 1718
Growth of beer production	1685–1726	1690	1	1690
Level of spirits production	1685–1726	1710*	5	1706, 1722, 1700, 1692, 1715
Growth of spirits production	1685–1726	1691	1	1691
% unfunded government debt (Mitchell)	1691–1726	1712*	3	1712, 1697, 1718
% unfunded government debt (Quinn)	1691–1726	1711*	4	1712, 1698, 1706, 1718
Works in 'Early English Prose Fiction'	1660–1700	1694	1	1694
English publications in British Library	1640–1760	1679*	1	1679
English publications in EEBO	1660–1700	1679*	1	1679
Exchange rate, Hamburg, schilling/£**	1640–1760	1648*	2	1648, 1756
Exchange rate, Paris, ecu/£**	1640–1760	1718*	> 5	1719, 1724, 1697, 1730, 1753
Real GDP	1640–1760	1722*	> 5	1722, 1651, 1747, 1756, 1686
Growth in real GDP	1640–1760	1647	2	1648, 1654
Number of estate acts	1640–1760	1688*	> 5	1691, 1707, 1702, 1660, 1753
Level of arable prices (Clark)	1640–1760	1665*	2	1652, 1647
Growth of arable prices (Clark)	1640–1760	1649	2	1649,1655
Level of pasture prices (Clark)	1640–1760	1703*	5	1703, 1647, 1652, 1694, 1686
Growth of pasture prices (Clark)	1640–1760	1649	1	1649
Level of wood prices (Clark)	1640–1760	1661*	2	1661, 1716
Growth of wood prices (Clark)	1640–1760	1655*	1	1655
Level of farm prices (Clark)	1640–1760	1665*	> 5	1687, 1647, 1652, 1700, 1693
Growth of farm prices (Clark)	1640–1760	1649	2	1649, 1655
Nominal farm wages (Clark)	1670–1730	1690*	1	1690
Growth of nominal farm wages (Clark)	1671–1730	1676	0	
Real agricultural output (Clark)***	1600–1800	1660*	2	1660, 1720
Growth of real agricultural output (Clark)***	1610–1800	1740	0	
Real agricultural output per farm worker (Clark)***	1600–1800	1670*	1	1670
Growth of real agri. output/farm worker (Clark)***	1610–1800	1660	0	
Real wages of laborers	1640–1760	1685*	2	1685, 1729
Growth of real wages of laborers	1640–1760	1650	1	1650
Real wages of craftsmen	1640–1760	1736*	1	1736
Growth of real wages of craftsmen	1640–1760	1648	1	1648
Level of real wages (Allen)	1640–1760	1677*	> 5	1690, 1683, 1714, 1677, 1726
Growth of real wages (Allen)	1640–1760	1648	1	1648
Level of consumer prices (Allen)	1640–1760	1670*	> 5	1678, 1650, 1690, 1700, 1730
Growth of consumer prices (Allen)	1640–1760	1648	1	1648
Level of real rent per acre	1640–1760	1701*	>5	1701, 1675, 1732, 1650, 1746
Growth of real rent per acre	1640–1760	1647*	1	1647
Patent count	1661–1740	1673	1	1673
Patent count, weighted by industrial spread	1661–1740	1716	4	1716, 1691, 1696, 1731
Growth rate of patent count**	1662–1740	1690	0	
Growth rate of weighted patent count**	1662–1740	1720	0	
Level of direct tax revenues	1655–1745	1689	3	1689, 1723, 1741
Growth of direct tax revenues	1656–1745	1690	1	1690
Level of indirect tax revenues	1655–1745	1698	> 5	1698, 1712, 1672, 1686, 1717
Growth of indirect tax revenues	1656–1745	1700	0	
Level of government revenues	1655–1745	1692	> 5	1692, 1702, 1687, 1702, 1717
Growth of government revenues	1656–1745	1673	1	1673

* Significant at 10%.
** Some years missing in data series.
*** Decadal rather than yearly observations.

5. Reflections

This paper uses a large set of facts to challenge a belief that is widespread within mainstream economics. That belief, the design hypothesis, is that the years 1688–1701 were a period of fundamental change in England, that the font of change was in the highest-level institutions, and that the institutional changes were a product of concerted action by those who understood how to effect productive revolution. The alternative hypothesis, the evolutionary one, is that change occurred over a long period, before and after 1688, and that the 1688–1701 reforms in high-level institutions were one small piece of a deep ongoing transformation. That is, institutional development occurred through the gradual accretion of large numbers of measures and was the product of the survival of workable arrangements.

The evidence presented is of two disparate kinds. First, Section 3 shows that the changes in the highest-level institutions that were long-lasting usually endorsed the legal status quo, while the changes that broke the mold often did not last. This is the epitome of evolutionary trial and error, not of successful design. Second, Section 4 shows that English society evidenced deep, ongoing changes throughout 1640–1760. Change started before 1688; it did not accelerate after. This again is characteristic of an evolutionary process and not of a concerted process to alter the status quo at a particular historical juncture.

This paper uses Hayek (1960) and North-Weingast (1989) as representative of the ideas underlying the two hypotheses because these are hugely influential works that use seventeenth-century English history to draw broader lessons. But the sets of ideas underlying these two different approaches cut across many areas of economics and influence many debates. Smith (2008) uses the terms constructivist and ecological rationality for a similar distinction, arguing that the interplay between these two concepts is fundamental. The same divide was hugely important in the debate on the post-socialist transition, when 'big-bang' and 'evolutionary' were the preferred terms (Sachs and Lipton, 1990; Murrell, 1992; Roland, 2000). Similarly, debates on the strategy and scope of development policy often center on the distinction between design and evolution (Sachs, 2005; Easterly, 2008).[29]

This paper's results also have relevance to broad disagreements in the literature on how to characterize typical paths of development. Hausmann et al. (2005, p. 328) are representative of one view emphasizing that "most growth accelerations are not preceded or accompanied by major changes in economic policies, institutional arrangements, political circumstances, or external conditions." Acemoglu and Robinson's (2012) emphasis on critical junctures provides the strongest alternative, as for example in concluding that Napoleon's imposition of new institutions across Europe worked exactly because there were radical changes that occurred in a 'Big Bang' style (Acemoglu et al., 2011).[30]

The ideas examined here also bear on the literature on the relationship between culture, institutions, and economic performance (Tabellini, 2008; Guisoet al., 2009; Gorodnichenko and Roland, 2016). That literature reaches into the deep historical roots of modern institutional performance, emphasizing the cultural origins of institutions and the complementarity of formal institutions and informal mores, conventions, and beliefs. This is a perspective resonant with Hayek's (1960, p. 62) emphasis on the "habits, tools and methods of doing things… rules of conduct… conventions and customs…unconscious patterns of conduct…habits and traditions".

Indeed, the specific conclusion of this paper, on English history, can be bolstered by noting that the post-1688 legal measures were a product of deliberations in which lawyer-politicians played a large role and the language of politics borrowed heavily from legal process (Nenner, 1977, p. 46). The worldview amongst English lawyers at that time was remarkably close to an evolutionary approach (Grajzl and Murrell, 2015):

> The Common Law of England is nothing else but the Common Custome of the Realm… And this Customary Lawe is the most perfect and most excellent, and without comparison the best, to make and preserve a Common-wealth: for the written lawes which are made eyther by the edicts of Princes, or by Counsells of Estate, are imposed upon the subject before any Trial or Probation made, whether the same be fit and agreeable to the nature and disposition of the people, or whether they will breed any inconvenience or no. But a Custome dothe never become a law to bind the people, untill it hath bin tried and approoved time out of mind; during all which time there did thereby arise no inconveniences for if it had been found inconvenient at any time, it had bin used no longer, but had become interrupted, and consequently it had lost the vertue and force of a lawe.
>
> Sir John Davies, Attorney General in Ireland in 1612 (Davies, 1628, p. 252).

One might say that those who wrote the post-1688 laws were constitutionally incapable of producing revolutionary institutional change.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jce.2016.08.007.

[29] Dixit's (2009) advice to policy-makers and experts on the building of governance institutions echoes elements of earlier evolutionary approaches. Likewise, the relative merits of transplanted and indigenous law point to a trade-off between quick imposition of a rigid design and slower adaptation to local circumstance (Posner, 1998; Grajzl and Dimitrova-Grajzl, 2009).

[30] See also Weingast (2005): "Both crises and ongoing constitutional adjustments seem central to the creation of self-enforcing constitutions that are stable for multiple generations."

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